
Space Weather Forecast

Issued on Friday, 11 March 2022 at 01:31 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Geomagnetic activity expected to increase days 3 and 4 with a chance of Minor Geomagnetic storms.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours. The largest flare of the past 24 hours, a long duration Common class flare, appears to be from the large plage region to the south of AR2962, and is currently on-going. This flare has emitted a large CME which is likely to have an Earth directed component, due to the source location in the northwest quadrant, plus the CME appears wide and generating a full halo. Analysis is currently being undertaken. There are six numbered sunspot regions on the visible disc, with AR2965 the largest and also magnetically complex, but surprisingly dormant at present. There are also two other large groups, AR2960 and AR2964, with AR2960 also magnetically complex. Yet despite the presence of these regions only a C-class flare from a plage region has occurred. The remaining sunspots on the visible disc are small, weak and magnetically simple.

There are also numerous - mostly small - filaments on the disc at present. The largest of these lifted off the southeastern limb late in the UTC evening of 09 March, with the resultant Coronal Mass Ejection (CME) clearly discernible in coronagraphs. This event has been modelled, and may influence Earth either late day 3 (13th) or more likely through day 4 (14th).

Solar Wind / Geomagnetic Activity: The solar wind was at background levels throughout. The strength of the magnetic field was weak and steady until 10/1636 UTC after which time it strengthened to temporarily become strong, then lowering slightly to end the day at moderate levels. The important north-south component was generally very weakly negative, but increased to become temporarily moderately negative in the evening, after which the north-south component became rapidly positive. The changes in the solar wind parameters indicated that a CME has arrived, probably the one emitted on 7th March, but this may have swept up and included the CME emitted on 5th March as well.

Geomagnetic activity was mainly Quiet but with an isolated Active interval 10/2100-2400 UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed, although the energetic particles did display an increase to slightly elevated levels late in the day, as a result of the CME that was emitted.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be low, with further common-class flares, but with a daily chance of rising to moderate-class - the main risk being from the complex northeastern sunspot region. Later in the forecast period new regions may rotate onto the visible disc from the far side.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

Solar Wind / Geomagnetic Activity: No enhanced solar winds feature in this forecast period. There are now two CMEs potentially Earth-directed, the first with low confidence from the 9th March southeast quadrant filament. This may influence Earth either late day 3 (13th) or through day 4 (14th). Although modelling is not yet complete for yesterday's large CME, it is expected to have an Earth directed component, possibly arriving day 3 and with probably a larger impact than the 9th March CME.

Geomagnetic activity is expected to be Unsettled to Active at first under the residual influence of yesterday's CME arrival, then decreasing mainly Quiet later today and through tomorrow (12th). During day 3 activity is likely to increase again, becoming Unsettled to Active, either under the influence of the 9th March CME but also possibly with the arrival of yesterday's CME. There is a chance of a Minor Storm each day, but especially during day 3.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, with energetic particles expected to remain predominantly at Background levels, albeit with a slight chance of rising above-the S1 level.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	40	20	50	40
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	20	20	20	20
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)